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WhatsApp versus electronic mail for dental education. Does time matters? A pilot study.

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WhatsApp versus electronic mail for dental education. Does time matters? A pilot study.

Abstract

Introduction: WhatsApp is an instant multimedia messaging and social media software which can be used for multiple purposes such as data, text, photographs and document transfer. Due to its versatility and multiple utilities, WhatsApp has been used within the educational setting in medicine and dentistry, proving a positive attitude of students toward its use.

Aim: To compare the reception time and the response time of WhatsApp with the traditional electronic email within the dental educational environment.

Method: A two-group comparative study was designed. Four multiple choice questions were sent via WhatsApp (group WA) and via electronic mail (group eM) to dental students. Data collected focused on the reception time and response time of students. Specifications of WhatsApp were used to collect data while an email tracker was used for the eM group. Excel software and Stata/IC version 15.1 software were used for data analysis.

Results: 74 dental students from the University x (*anonymised for reviewing purposes*) dental school agreed to take part in this experience. However, 59 provided their responses (80%). 44 were females and 15 were males. 27 participants were randomly allocated to the WA group and 32 to the eM group. The statistical analysis revealed a significant difference between groups: Reception time, p: 0.0286 value

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and response time, p: 0.0448 value indicating that the WA group was significantly faster in terms of reception and response time.

Conclusion: This pilot study suggests that WhatsApp is more efficient in terms of reception and response time than electronic emails.

Keywords: Instant message, WhatsApp, Dental education, Comparative study.

Background

WhatsApp is an instant multimedia messaging and social media application launched in February 2009, owned by Facebook. It has been estimated that WhatsApp has around 1.5 billion users world-wide and manages over 60 billion messages per day[1]. WhatsApp runs in smartphones and there is a version for computers and laptops. Due to its versatility and multiple utilities, WhatsApp has been used within the educational setting. In medical education there is evidence of its use for supporting teaching, passing information to patients and also to collaborate between peers[2]. Things are not that different in dentistry as WhatsApp has been used for various purposes such as forensics, histology and pathology[3]. Also, it has be reported the effective use of WhatsApp for asking remote located experts a second opinion about oral cancer using photographic records of histology cuts[4]. In the same line, some authors had used WhatsApp to discuss and share photographic records of oral cancer patients among colleagues[5]. Others had used WhatsApp to support an English course for dental students[6]. In that study the authors compared the results of an assessment of two groups, one using traditional teaching and the other using the same method plus WhatsApp. Results significantly favoured students who used WhatsApp. Similar positive results were reported when WhatsApp was used for teaching and discussing cases of dental radiology[7].

One of the main advantages reported of the use of WhatsApp is the time saved when sending documents to various people[8] and the capacity to check who has received or read the message[9]. Some authors had suggested that WhatsApp should be used for teaching and learning in order to improve students' performance[3].Perception analysis of students reveals a positive attitude and contentment of users toward this technology[9]. Furthermore, some evidence suggests that students felt motivated when using WhatsApp as it favoured the learning experience making it more amenable[6].

Even though WhatsApp seems to fulfil the need when it comes to send files, photos and messages, it is worth to ask if this method should replace traditional ones such as the electronic email. Electronic emails have been around for more than 40 years, and they are still the preferred method of communication by institutions.

The "instant" characteristic of WhatsApp messages seems to be one of the most appealing features of the resources, however studies comparing the reception time and response time of users with other method has not been explored. Therefore, this pilot study aims to compare WhatsApp and electronic email in terms of the time, exploring if users do receive the message more instantaneously and if their responses time is influenced by the platform used.

Materials and method

A two-group comparative study was designed which was conducted in two phases. Both phases were framed following the guidelines of the Helsinki Declaration [10] to avoid ethical concerns. Additionally, ethical clearance was granted by *University x* (*anonymised for reviewing purposes*) ethical committee (resolution CEC number: 193).

The first phase was exploratory to identify potential technical complications on conducting the experiment. Twenty 4th year dental students were invited using a convenience sampling strategy. Two groups of ten individuals were conformed. All target participants agreed to take part after verbal explanation of the experiment and their participation was voluntary; additionally, written consent was sought. The design included four multiple choice questions which were sent via WhatsApp (group WA) and via electronic mail (group eM). Questions were dentistry-related and in accordance with the subject students were reviewing at the time. Participants knew that they were going to receive a WhatsApp message or an electronic email, but they were unaware about the date and time of the messages.

To ensure privacy of students and protect their contact details, a new mobile phone sim card was used, which was bought especially for the experiment. The sim card was inserted in an Alcatel One touch Pixi phone and Wi-Fi connection within the dental school was used. Members of the research team had exclusive access to the mobile phone and its use was restricted within the school facilities. A WhatsApp chat-group was created which included all the numbers of those participants who were randomly allocated in the WA category. Participants were requested to respond individually and not through the chat group in order to have a record of the response time and date. The WA data was obtained from

each individual chat as WhatsApp provides the precise time when the first message was sent, the time that the subject opened the message and the time the response was generated.

For the eM group, the authors had record of the time when the electronic message was sent, and the response was received. To register the time that the participant opened the message an email tracker was used. Mailtrack was the choice as it is a free software capable of tracking the activity of an email which were sent from an associated account. Mailtrack has the capacity to inform the sender the exact time when the receiver opens an email message. It does not store or distribute the user or the receiver's details keeping information save and private. In this experiment the researcher downloaded Mailtrack and used Gmail to send the electronic mails. The authors recorded the sending, reception, response time, and date for each participant. Data was collected in Excel software and statistics were analysed using Stata/IC version 15.1 software.

As no problems were identified with the design of the study, the second phase was implemented. This time 3rd year dental students were targeted. The complete year cohort (n: 115) was invited to take part. An invitation email was sent by their course delegate containing and information sheet, which described the experiment and a consent form. Participants who intended to take part where requested to complete the consent form and provide their contact details, including electronic email and mobile phone number. Potential participants were randomised in two groups (WA and eM) and the treatment applied was the same used in phase one.

Results

Considering the two phases 74 individuals agreed to take part. From those 59 provided their responses (80% of participation). From the participants, 44 were females and 15 were males. 27 participants formed part of the WA group and 32 from the eM group.

Descriptive statistics revealed a median time of 1h:33m:49s (WA) and 15h:31m:00s (eM) for reception of the message and of 16h:59m:47s (WA) and 24h:09m:04s (eM) for response time. The median difference between both groups was approximately 15 hours and 30 minutes for reception time and 9 hours for response time. Meaning that participants using WhatsApp received and send their response faster than the ones using electronic emails.

T-tests comparing the response time and reception time for each group were conducted. Prior to the analysis data was normalised using a log treatment. Results from the statistical analysis revealed significant difference in the times recorded. Reception times obtained a p: 0.0286 value and response

time obtained a p: 0.0448 value indicating that the WA group was significantly faster in terms of receiving the information and generating a response.

The complete data set can be observed in Table 1.

Discussion

The capacity of WhatsApp to transfer data instantly has been recognised as one of the most attractive feature[8]. As far as the authors acknowledge this is the first study comparing the effectivity of WhatsApp with other methods to transfer data and information. Results of this pilot study suggest that WhatsApp is more effective than electronic mail regarding reception time and response time of users.

As described in the methodology, participants did not know when they were going to receive the questions. This could have its effect on the reception and response time; however, the condition was the same for both groups. Additionally, good students could have been more motivated to reply the questions faster as they were dentistry related. Randomisation when conforming each study group was used to avoid affecting the results. Yet, a larger sample would diminish this potential risk.

The fact that more students have smartphones and the familiarity they have with this technology might be a good chance for educators to use this tool in their favour. WhatsApp has demonstrated to be useful for different purposes for education [1–4,6]. Considering the literature and the results of this study it might be appropriate to include WhatsApp to the tool set of the faculty. This could result in more effective communication between students and academics. Also, it can result in a faster way to deliver documents, images or information to students ensuring they do receive it as soon as possible. Additionally, the excellent acceptation of students shown in previous studies[9], reinforce the idea that it might be worthy to include this technology on daily basis.

With this information the authors are not suggesting that the electronic emails should be replaced by instant messaging service such as WhatsApp. On the contrary, they consider this as an opportunity to strengthen the relationship between academics and students, with the objective of having a more expedite line of communication.

Among the limitations of the study, the authors recognise the number of participants is not large enough to make solid conclusions, yet, the intention is to outgrow this number in the future to obtain more conclusive results. Another limitation spotted was the time of the year when the experiment was conducted which was during the last term of the year; time when students are busy and unwilling to

collaborate with research activities. This is another point to consider when replicating this study. The last identified limitation was the homogeneity of the participants. All of them belong to the same dental school, therefore it might be interesting to repeat the test in other educational institutions and transformed it into a multicentre study. Even more, as WhatsApp is a wide world recognised software application this study could involve participants from schools of different counties.

It is important to highlight that this pilot study focused in the time participants took to view a determinate information and how long they took to respond back. It did not focus on the quality or the reflective process of the answers. In the future, the research team wants to look at these two variables to elucidate if there are differences within the reflective process when instant messaging systems are used. Additionally, it would be interesting to include a perception section to explore the reasons why they do prefer one or the other communication method.

The authors can recommend some measures considered during the experiment. The main aspect was to protect the privacy of students and academics. Therefore, they recommend having a mobile phone and a sim card limited for academic purposes, that is used only inside the school. This will limit the risk of exposing private information of students and academics such as their mobile phone number. Also, students and faculty need to recognise that there are certain working hours were the information will be read and/or sent. No one would like to receive nor send academic information out of working hours; thus, the mobile phone needs to be managed and stored inside the school. While this will imply a cost, any smart mobile phone and a sim card would work as WhatsApp can run using Wi-Fi-Internet connection provided by the school. The last recommendation would be the need to instruct members of staff to embrace this technology to take advantage of all the capabilities WhatsApp offers.

Conclusions

The conclusion of this pilot study is that WhatsApp seems to be more efficient in terms of reception and response time compared to electronic email. This suggest that using this messaging method results in a expedite communication between students and faculty members.

Acknowledgement

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Conflict of interest

All authors state that they have no conflict of interest.

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Table

Table 1: Delivery time, reception time and response time of participants per group.

	Delivery date and time	*Reception date and time*	*Response date and time*	*Reception time*	*Response time*	*Group*
1	16-11-2018 10:53	16-11-2018 10:57	16-11-2018 11:02	0:04:00	0:09:00	WA
2	16-11-2018 10:53	16-11-2018 12:25	16-11-2018 13:13	1:32:00	2:20:00	WA
3	16-11-2018 10:53	16-11-2018 12:57	16-11-2018 13:04	2:04:00	2:11:00	WA
4	16-11-2018 10:53	16-11-2018 10:56	16-11-2018 11:03	0:03:00	0:10:00	WA
5	16-11-2018 10:53	16-11-2018 11:17	16-11-2018 11:20	11:20:00	0:27:00	WA
6	16-11-2018 10:53	16-11-2018 10:58	16-11-2018 11:05	0:05:00	0:12:00	WA
7	16-11-2018 10:53	16-11-2018 12:47	18-11-2018 19:23	1:54:00	56:30:00	WA
8	16-11-2018 10:53	16-11-2018 12:37	17-11-2018 20:39	1:44:00	33:46:00	WA
9	16-11-2018 10:53	16-11-2018 12:16	16-11-2018 12:20	1:23:00	1:27:00	WA
10	16-11-2018 10:53	16-11-2018 12:19	16-11-2018 12:21	1:26:00	1:28:00	WA
11	16-11-2018 10:53	16-11-2018 12:18	19-11-2018 10:46	1:25:00	71:53:00	WA
12	16-11-2018 10:53	16-11-2018 10:56	16-11-2018 11:07	0:03:00	0:14:00	WA
13	16-11-2018 10:53	16-11-2018 11:00	16-11-2018 11:07	0:07:00	0:14:00	WA
14	16-11-2018 10:53	16-11-2018 19:30	16-11-2018 19:30	8:37:00	8:37:00	WA
15	16-11-2018 10:53	16-11-2018 11:57	16-11-2018 19:34	1:04:00	8:41:00	WA
16	16-11-2018 10:53	16-11-2018 11:00	16-11-2018 11:08	0:07:00	0:15:00	WA
17	16-11-2018 10:53	16-11-2018 16:04	18-11-2018 10:36	5:11:00	47:43:00	WA
18	16-11-2018 10:53	16-11-2018 10:57	16-11-2018 11:02	0:04:00	0:09:00	WA
19	16-11-2018 10:53	16-11-2018 12:48	16-11-2018 12:59	1:55:00	2:06:00	WA
20	16-11-2018 10:53	16-11-2018 12:20	16-11-2018 11:10	1:27:00	0:17:00	WA
21	16-11-2018 10:53	16-11-2018 10:58	16-11-2018 11:10	0:05:00	0:17:00	WA
22	16-11-2018 10:53	16-11-2018 10:56	16-11-2018 14:31	0:03:00	3:38:00	WA
23	16-11-2018 10:53	16-11-2018 12:22	16-11-2018 14:44	1:29:00	3:51:00	WA
24	07-09-2018 11:48	07-09-2018 11:55	10-09-2018 6:19	0:07:00	66:31:00	WA
25	07-09-2018 11:48	07-09-2018 11:50	09-09-2018 21:23	0:02:00	57:35:00	WA
26	07-09-2018 11:48	07-09-2018 12:04	10-09-2018 12:34	0:16:00	72:46:00	WA
27	07-09-2018 11:48	07-09-2018 11:58	08-09-2018 20:27	0:10:00	32:39:00	WA
1	16-11-2018 11:12	16-11-2018 12:54	19-11-2018 21:57	1:42:00	82:45:00	eM
2	16-11-2018 10:53	19-11-2018 11:55	19-11-2018 20:29	73:02:00	81:36:00	eM
3	16-11-2018 11:14	18-11-2018 13:00	18-11-2018 13:08	49:46:00	49:54:00	eM
4	16-11-2018 11:16	17-11-2018 22:52	17-11-2018 23:08	35:36:00	35:52:00	eM
5	16-11-2018 11:17	17-11-2018 19:15	17-11-2018 19:25	31:58:00	32:08:00	eM
6	16-11-2018 10:56	16-11-2018 12:34	17-11-2018 12:51	1:38:00	25:55:00	eM
7	16-11-2018 10:52	16-11-2018 21:10	16-11-2018 21:11	10:18:00	10:19:00	eM
8	16-11-2018 11:02	16-11-2018 20:51	16-11-2018 20:53	9:49:00	9:51:00	eM
9	16-11-2018 11:13	16-11-2018 18:36	16-11-2018 18:48	7:23:00	7:35:00	eM
10	16-11-2018 11:06	16-11-2018 11:08	16-11-2018 18:16	0:02:00	7:10:00	eM
11	16-11-2018 10:57	16-11-2018 11:02	16-11-2018 17:04	0:05:00	6:07:00	eM
12	16-11-2018 10:59	16-11-2018 16:17	16-11-2018 16:22	5:18:00	5:23:00	eM

13	16-11-2018 11:07	16-11-2018 11:23	16-11-2018 16:07	0:16:00	5:00:00	eM
14	16-11-2018 11:10	16-11-2018 13:09	16-11-2018 13:12	1:59:00	2:02:00	eM
15	16-11-2018 11:06	16-11-2018 12:26	16-11-2018 12:46	1:20:00	1:40:00	eM
16	16-11-2018 11:00	16-11-2018 12:23	16-11-2018 12:28	1:23:00	1:28:00	eM
17	16-11-2018 11:08	16-11-2018 12:21	16-11-2018 12:24	1:13:00	1:16:00	eM
18	16-11-2018 10:58	16-11-2018 12:17	16-11-2018 12:21	1:19:00	1:23:00	eM
19	16-11-2018 11:17	16-11-2018 12:16	16-11-2018 12:20	0:59:00	1:03:00	eM
20	16-11-2018 11:09	16-11-2018 11:11	16-11-2018 12:10	0:02:00	1:01:00	eM
21	16-11-2018 11:01	16-11-2018 11:03	16-11-2018 11:07	0:02:00	0:06:00	eM
22	16-11-2018 11:04	16-11-2018 11:48	16-11-2018 11:57	0:44:00	0:53:00	eM
23	07-09-2018 12:00	07-09-2018 13:17	07-09-2018 13:26	1:17:00	1:26:00	eM
24	07-09-2018 11:54	09-09-2018 21:19	09-09-2018 21:27	9:25:00	57:33:00	eM
25	07-09-2018 11:51	08-09-2018 22:08	09-09-2018 21:13	10:17:00	57:22:00	eM
26	07-09-2018 11:56	09-09-2018 21:53	09-09-2018 22:03	9:57:00	58:07:00	eM
27	07-09-2018 11:55	07-09-2018 14:33	09-09-2018 22:28	2:38:00	58:33:00	eM
28	07-09-2018 11:56	07-09-2018 11:57	09-09-2018 22:05	0:01:00	58:09:00	eM
29	07-09-2018 11:58	09-09-2018 12:32	09-09-2018 12:50	0:34:00	48:52:00	eM
30	07-09-2018 11:59	07-09-2018 11:59	07-09-2018 12:14	0:00:04	0:15:00	eM
31	07-09-2018 11:53	09-09-2018 22:10	10-09-2018 1:50	10:17:00	61:57:00	eM
32	07-09-2018 12:01	07-09-2018 12:13	09-09-2018 21:43	0:12:00	57:42:00	eM